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The Prevalence of General and Abdominal Obesity, among Taxi Drivers of Zahedan, Southeast of Iran, 2015

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Abstract: Obesity is one of the important health problems worldwide, which is dramatically growing among taxi drivers. This study aimed to determine the prevalence of general and abdominal obesity and some associated risk factors among taxi drivers in Zahedan, Iran. This cross sectional study was randomly performed among 1100 taxi drivers aged 21- 72 years. Weight, height, body mass index (BMI), waist circumference (WC) and waist to height ratio (WHtR) were measured as simple screening tools for evaluation of overweight, obesity and abdominal obesity. Results showed that according to BMI cut-offs, the prevalence of overweight and obesity was 37.9 and 14.3 %, respectively (P <0.0001). The presence of abdominal obesity based on the WC and WHtR was16.4 and 62.4 %, respectively (both P<0.0001).Predictive factors for obesity /abdominal obesity were persons aged 31-50 years, physical inactivity, levels of education and driving experience over 5 years.In conclusion, the prevalence of abdominal obesity using WHtR among taxi drivers was higher than expected. Since little studies on abdominal obesity using WHtR has been done in taxi drivers, it is suggested that further research be performed to evaluate this parameter.

Key words: Overweight · Obesity · Abdominal Obesity · Taxi Drivers

INTRODUCTION

Obesity is a major health problem that is rapidly increasing worldwide [1, 2]. There is evidence that obesity is a complex and multi-factorial disease, which is commonly linked to the lifestyle, environment and genetic interactions and endocrine disorders, medications or psychiatric illness. Other factors also influence obesity, including aging, excessive food energy intake and low physical activity [3, 4]. Obesity and abdominal obesity contribute to increase the co-morbidities, including type II diabetes, cardiovascular disease (CVD), metabolic syndrome, various cancers, apnea and other health problems [1-6]. Although, the prevalence rate of obesity in a few developed countries including the United Kingdom and Germany experienced has decreased, in the past decade, the prevalence of obesity in many parts of the world, especially in the Asia Pacific region such as Japan and China [1] and in the developing countries such as the Middle East countries such as Syria [6] and Iran [1, 5] is dramatically increasing. It is estimated that 1.35 billion and 573 million of adult population worldwide will be overweight or obese by 2030 [6, 7], compared with 2.1 billion in 2013 and 937 million in 2005 [7] and 857 million in 1980 [8]. The prevalence of overweight and obesity in different countries vary from 62 and 26% in the Americas to 14 and 3% in South East Asia, respectively [9].In a National survey, the prevalence of obesity and central obesity was reported to be 22.3and 53.6%, respectively [10].The prevalence of overweight and obesity for Iranian population was 34.6 and 13.1% in 2010 [11] and 41.4% and 21.3% in 2012 [2]. On the other hand, the prevalence of obesity/abdominal obesity and its association with occupational factors has also been reported in several studies. A cross sectional study among Italian and Taiwan bus drivers demonstrated that the rate of obesity was 9.6 and 61%, respectively [12, 13]. A study among Iranian professional drivers demonstrated that

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the prevalence of overweight, obesity and abdominal obesity was71.4, 25.7 and 55.3 % in truck drivers of Bandar Abbas, respectively [14]. It has been documented thattaxi drivers especially those with longer driving experience, low level of education and physical inactivity, are more at risk of occupational disorders including obesity, hypertension and diabetes [1, 4, 15, 16]. On the other hand, obesity can affect the quality of sleep of these individuals. These factors lead to loss of consciousness at the time of driving and high risk of injury to the driver and passengers [17]. Therefore, an evaluation of obesity greatly assists to identifying high risk groups. The aim of this study was to evaluate the prevalence of overweight, obesity and abdominal obesity and some associated risk factors among taxi drivers of Zahedan, located in Southeast of Iran.

MATERIALS AND METHODS

The present study was conducted in two of the largest taxi companies, which had nearly 3,500 taxi drivers. A total of 1100 taxi drivers (mean age :41.8±10.7 yr) were randomly selected to participate in this study from July 2015 to January 2016. Because of the small percentage of female drivers in the total sample, all taxi drivers who participated in the study were male.

Inclusion criteria were as follows, a) at least 2 years work experience with no history of endocrine disorders including diabetes, thyroid; renal failure, cardiovascular disease and cancer, b) The drivers should have had no corticosteroid medications in the last two years, c) Not using diet therapy for weight gain or weight loss and/or nutritional supplements for at least three months prior to the study. After explaining the aim of study, those who would like to participate in the study were enrolled. A demographic form, including age, education, physical activity (at least 3 times a week for ≥ 30 minutes) and driving experience was completed for each participant.

Weight was measured using a digital scale with a capacity of 150 kg and accuracy to the nearest 100 g in normal clothes and without shoes. Standing height was measured without shoes to the nearest 0.5 cm using the stadiometer with the shoulders in relaxed position and arms hanging freely.

Body mass index (BMI) was calculated as weight (kg) divided by the square of the height (m^2). According to the WHO criteria, overweight was defined as BMI= 25 to 29.9 kg/m^2 and obesity as BMI ≥30 kg/m^2 [1].

The waist circumference (WC) and waist to height ratio (WHtR) were measured as simple screening tools for measuring abdominal obesity. Waist circumference was measured by a non-elastic tape at the midway between the lower rib margin and the iliac-crest at the end of expiration. WC ≥102 [5] and WHtR ≥ 0.5 [8, 19] were considered as prognostic predictors of abdominal obesity.

The study protocol was approved by the ethics committee of Zahedan University of Medical Sciences (approval date 28 June 2015; number 7242). All subjects gave informed consent before taking part in the study.

Statistical Analysis: Data were analyzed using SPSS statistical software package program (version 21 for windows, Chicago, USA). The results were expressed as mean±standard deviation with range and Odds ratio and [95% confidence interval (CI)], as appropriate. The descriptive analysis was used to determine the percentage of abdominal obesity, overweight and general obesity among taxi drivers. The data were compared by the One-Sample t- test and chi-square test. Pearson correlation coefficient was used for assessment of correlations. $P< 0.05$ was considered statistically significant.

RESULTS

Demographic characteristics and prevalence of general and abdominal obesity parameters among the taxi drivers are demonstrated in Table 1. The age of participants was from 21 to 72 years with mean age 41.8±10.7 years. For statistical analysis, age groups were classified into age ≤ 30 years as young, 31- 50 years as middle-age and age > 50 years as old persons. Most subjects were at age 31-50 years old (64.5%) (P <0.0001).A large proportion of taxi drivers (53.6%) were under diploma, 64.8% of them had any physical activity per week (P<0.0001) and 78.3% had over 5 years of driving experience (P<0.0001). The mean of BMI (P< 0.01), WC (P< 0.0001) and WHtR (P< 0.0001) were significantly increased compared to standard values. According to BMI cut-offs, the prevalence of overweight and obesity was 37.9 and 14.3 %, respectively (P <0.0001). These figures for abdominal obesity based on the WC and WHtR were 16.4 and 62.4 %, respectively (both P<0.0001).

The prevalence of general and abdominal obesity based on age groups and driving experience is reported in Table 2. The highest prevalence of overweight and obesity (66.7 and 71.3%) (P<0.01) and abdominal obesity

Table 1: Demographic data of participants

Parameters	Mean±SD	Min- Max	Pv
Age (yrs)	41.8±10.7	21-72	
Weight (kg)	75.4±14.6	41.7 -188	
Height (cm)	172±6.7	147-195	
*BMI (kg/m²)	25.5±4.6	14.6- 60.7	< 0.01
*WC (cm)	89.2±12.7	53- 138	< 0.0001
*WHtR	0.52±0.07	0.31-0.77	< 0.0001
Driver experience (yrs)	12.7±9.3	2- 47	
- Education (n %)			
Illiteracy	30 (2.8 %)	-	
Under diploma	590 (53.6%)		<0.0001
Diploma and over	480 (43.6%)		
- Physical activity (n %)			
<30 min/week	109(9.9%)		
≥ 30min/week	278(25.3%)	-	<0.0001
No activity	713(64.8%)		
Drivingexperience (n %)			
≤5 yrs	239(21.7%)	-	P<0.0001
>5 yrs	861(78.3%)		
- Age (n %)			
≤30	131(11.9%)	-	<0.0001
31-50	710(64.5%)		
>50	259(23.5%)	-	
- BMI (n %)			
< 25	526(47.8%)		
25-29.9	417 (37.9%)		<0.0001
≤ 30	157(14.3%)	-	
- WC (n %)			
<102	920(83.6%)		
≥102	180(16.4%)	-	<0.0001
- WHtR(n %)			
<0.5	414(37.6%)		
≥0.5	686 (62.4%)		<0.0001

Table 2: The prevalence of general and abdominal obesity in participants based on age (yrs) and deriving experience (yrs)

	Age (yrs)			Deriving experience (yrs)	
Parameters	≤ 30	31-50	>50	≤ 5	>5
-BMI (kg/m²)					
< 25	83(15.8 %)	34(8.2 %)	14(8.9%)	119(22.6%)	07(77.4%)
25-29.9	320(60.8%)	123(23.4%)	278(66.7 %)	88(21.1%)	29(79.8%)
≥ 30	105(25.2%)	112(71.3 %)	31(19.7%)	32(20.4%)	5(79.6%)
Pv	<0.01			\ NS	
-WC (cm)					
<102	124(13.5%)	7(3.9%)	578(63.8%)	219(23.8%)	701(76.2%)
≥102	209(22.7%)	123(68.3%)	50(27.8%)	20(11.1%)	160(88.9%)
Pv	<0.001			<0.0001	
-WhtR					
<0.5	77(20.5%)	46(6.7%)	242(64.5%)	106(28.3%)	269(71.7%)
≥0.5	56(14.9%)	447(65.2%)	193(28.1%)	133(18.4%)	592(81.6%)
Pv	<0.0001			<0.0001	

BMI: body mass index ; WC :waist circumference ; WHtR: waist-to-height ratio

using WC and WHtR (68.3 and 65.2%) were found in the ages of 31-50 years old (P<0.001, P<0.0001), respectively. The odds ratio for general obesity, WC and WHtR by age groups was 0.8 (95% CI; 0.5 to 1.2), 1.66 (95% CI; 1.2- 2.2) and 2.58 (95% CI; 1.5-4.1), respectively. According to driving experience, the prevalence of overweight and

obesity (79.8 and 79.6 %) (P>0.05) and abdominal obesity based on WC and WHtR (85.4 and 81.6 %) was higher among those who had > 5 years driving experience (both P<0.0001). The odds ratio for obese drivers with WC ≥102 and WHtR ≥0.5 in those with driving experience more than 5 years was 1.97 (95% CI; 1.4- 2.7) and 1.75 (95% CI; 1.3- 2.3), respectively.

Regression analysis showed that BMI, WC and WHtR positively correlated with age (P<0.05, P<0.0001 and P<0.0001, respectively), whereas a positive correlation of WC and WHtR was found only with driving experience (both, P<0.0001). Furthermore, a reverse correlation was found between BMI, WC and WHtR with physical activity (P=0.004, P=0.03and P=0.02, respectively) and also between WC and WHtR with education levels (P=0.003 and P<0.0001, respectively).

DISCUSSION

The current study presents data on different BMI categories, waist circumference and weight to height ratio in a sample of Iranian taxi drivers aged 21- 72. The results of present study on various BMI cutoffs indicated that the prevalence of overweight and obesity among taxi drivers was 37.9 and 14.3%, respectively. These results correspond to those of previous studies in Iranian population (34.6 and 13.1%) in Semnan province [11] and (41.4 and 21.3%) in Tehran [2].

In a study done among taxi drivers in Tehran, it was found that the rate of overweight and obesity was 26.6 and 40.6%, respectively, which significantly correlated with aging, low level of education and physical inactivity [4].

These values among Iranian bus and truck drivers in Kashan were 41 and 23.1% [18] and among truck drivers in Bandar Abbas were 71.4 and 25.7%, respectively [14].

Studies in worldwide also demonstrated that the prevalence of overweight and obesity among truck drivers in Sao Paulo, Southeastern Brazil was 34.6 and 15.4%, respectively [18]. While, in other surveys, the prevalence of obesity among professional drivers varied from 9.6% in Taiwan [12], 61% in Italy [13] to 83.4% in US [20].

The studies have shown that with an increase in BMI, the risk of non-communicable diseases such as cardiovascular disease (CVD), diabetes and some cancers increases [12, 21]. BMI is considered to be one of the useful predictors for screening of overweight and obesity in adults [22, 23] that may lead to health problems, but due to body composition changes in aging, it cannot specify the difference between fat and muscle mass [22]. Therefore, other anthropometric parameters including waist circumference (WC), waist to hip ratio (WHpR) and waist to height ratio (WHtR) have been suggested for predicting of obesity [24].

There is an evidence that the occupation of driving is associated with increased intra-abdominal fat accumulation, which is one of the used indicators for central obesity in population studies and is associated with a variety of metabolic disorders and other forms of chronic diseases [5] and increased cardiovascular mortality in adults [21, 22, 25, 26].

The measurement of WC, WhpR and WhtR as rapid and simple screening tools for diagnosis of obesity [1, 5] reflects central fat accumulation [1]. Thus, the evaluation of central obesity is suggested to be more useful for defining obesity than BMI [27, 28]. Results of some prospective studies showed that the evaluation of WHtR provides the basis for a simple public health campaign [29], and for detecting cardiovascular risk factors, WHtR was better than WC, WHpR and BMI [29-31].

The findings of our study revealed that the rate of abdominal obesity among taxi drivers based on WHtR was more than WC (62.4% vs 16.4%), suggesting that WHtR is a better indicator for predicting of abdominal obesity compared with WC.

Overall, a few studies have investigated the status of abdominal obesity using WC and WHpR among taxi drivers and insufficient research has been performed to assess the WHtR of professional drivers.

A study performed among Iranian population aged 30-70 years old in Semnan province showed that the prevalence of central obesity using WHpR and WC was 72.2 and 26.6%, respectively [11]. In a cross sectional study, among truck drivers in the central part of Iran, the rate of abdominal obesity based on WC was 68.3% [18], in Bandar Abbas was 55.3% [14], in the Ghazvin was 54% [32], in West Azerbaijan province was 50.5% [33]. These values, among male truck drivers in Sao Paulo, from 2006 to 2011, were 19.8 to 52.8% [34]. Most of these studies have shown that obesity is associated with driving [19, 32, 35]. The observed differences among taxi and truck drivers with the general population could be associated with some unhealthy lifestyle patterns such as the inadequate leisure time for physical activity and sedentary life style, disruptions in diet [15, 18, 23, 26, 32, 33, 36], long hours spent at work [23, 34], years of experience in taxi-driving [15, 26, 35], shift work [32, 36], night work and occupational stress [18, 23], low level of education [5] and older age [4, 5] as significant parameters, which can lead to weight gain, in particular, abdominal obesity and associated co morbidities, such as

cardiovascular function [26, 36] and musculoskeletal disorders [23].In a study, the prevalence of central obesity based on WC and WHpR was more among irregular-shift drivers (both 71%) than day-shift drivers (42.3 and 46.1%) [36]. The type of working shift influences eating habits, in particular, during nighttime meals[33], however, long working hours and a sedentary life style in day-drivers can also contribute to obesity [23, 35,36]. In our study, all participants worked in the day shifts. The drivers who working day shifts may have unsuitable life styles that can contribute to obesity.

Assessment of physical activity showed that most of the taxi drivers had any physical activity per week and a negative correlation was found between physical activity with obesity / abdominal obesity and driving experience; this may be a possible explanation for higher prevalence of obesity in present study. Previous studies have also reported that because the drivers often spend driving long hours in work shifts, they have the lower physical activity in their leisure time [23,37], for this reason obesity is more common among the professional drivers [15, 18, 26, 32,33].In addition, general and abdominal obesity in the present study's participants increased at middle - age and decreased with level of education ; from 88.2% in those with basic to diploma education levels to 11.8 % in those with university degrees (data not shown). The age group of 31-50 was shown to be at risk, the risk of general obesity using BMI and abdominal obesity using WC and WHtR by age group was 0.8 and 1.66 and 2.58, respectively and by the level of education was 0.88, 0.59 and 0.67, respectively. A significant positive relationship between obesity and abdominal obesity with age and physical activity was found; this finding is in line with the previous surveys [4, 32]. In a study of US, high mortality of CVD in truck drivers younger than 55 years was found and it was recommended that preventive interventions are implemented in this age group [20].

Moreover, the low prevalence of abdominal obesity with increasing educational level is in agreement with previous studies in general population [13, 38, 39], which may partly be attributed to higher socioeconomic level and consume low energy density foods with high quality in educated people [41]. Driving experience is also one of the occupational factors associated with obesity, which has been evaluated and confirmed in some studies [15, 26, 35]. At present study, the higher prevalence rates of obesity and abdominal obesity among those who had > 5 years driving experience was shown. The drivers had 1.9 and 1.7 the risk of obesity and abdominal obesity, suggesting that those with longer driving experience were at higher risk of obesity.

Overall, it seems that the variations in prevalence of obesity in our survey be related to age 31-50 years, physical inactivity, level of education and driving experience over 5 years. Thus, with regard to the relationship between obesity, abdominal fatness and risk of a wide range of illnesses including metabolic syndrome [18, 32, 33], increased risk of CVD and other occupational morbidities [4, 12, 14, 36], which can jeopardize the health of drivers and passengers [17], the implementation of obesity prevention strategies and training programs on risk factors and obesity-related diseases is necessary.

The present study has several strengths, including a) the study population that all were male; b) a large sample size, which able us to obtain the data required for analysis at a low cost.

However, this study had several limitations. Firstly, a small number of similar studies on taxi drivers, in particular, studies related to evaluation of WHtR. Secondly, the drivers who declined to participate were more than those who agreed to participate in the study.

CONCLUSIONS

The prevalence of abdominal obesity using WHtR among taxi drivers was higher than expected. However, further research to assess this parameter and the implementation of useful strategies to prevent obesity epidemic is recommended.

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